

IN THE CLAIMS:

1. **(Original)** An acoustic sensor comprising:
  - at least one resonant element;
  - a driver comprising an electrical coupling means and an electromagnetic field source, arranged such that, in use, the electrical coupling means transfers current to the electromagnetic field source which produces an electromagnetic field that drives the at least one resonant element to produce acoustic waves directed to a predetermined part of a test sample;
  - an electromagnetic detector arranged to receive, in use, the acoustic spectrum emitted from the test sample after the acoustic waves have interacted with the test sample; and
  - an electrical circuit connected to the driver and electromagnetic detector, the circuit arranged, in use, to provide the current and to detect, in combination with the electromagnetic detector, the acoustic spectrum received by the electromagnetic detector.
2. **(Currently Amended)** AThe sensor according to claim 1, wherein the electronicelectrical circuit comprises an electrical oscillator.
3. **(Currently Amended)** AThe sensor according to claim 1, wherein the electronicelectrical circuit comprises a frequency modulated signal generator, an AM diode detector and a lock-in amplifier.

4. **(Currently Amended)** AThe sensor according to claim 1, wherein the electromagnetic field source and the electromagnetic detector are the same member.
5. **(Currently Amended)** AThe sensor according to claim 1, wherein the electromagnetic field source is a single wire.
6. **(Currently Amended)** AThe sensor according to claim 4, wherein the electromagnetic field source is a coil.
7. **(Currently Amended)** AThe sensor according to claim 6, wherein the coil is spiral.
8. **(Currently Amended)** AThe sensor according to claim 7, wherein the coil is copper.
9. **(Currently Amended)** AThe sensor according to claim 8, wherein the coil is formed from wire wound into a flat spiral element.
10. **(Currently Amended)** AThe sensor according to claim 4, wherein the electromagnetic field source is a microwave horn.
11. **(Currently Amended)** AThe sensor according to claim, claim 10, wherein the electromagnetic detector is a single wire.
12. **(Currently Amended)** AThe sensor according to claim 10, wherein the electromagnetic detector is a coil.
13. **(Currently Amended)** AThe sensor according to claim 12, wherein the coil is spiral.
14. **(Currently Amended)** AThe sensor according to claim 13, wherein the coil is copper.

15. **(Currently Amended)** AThe sensor according to 14, wherein the coil is formed from wire wound into flat spiral element.
16. **(Currently Amended)** AThe sensor according to claim 10, wherein the electromagnetic detector is a microwave horn.
17. **(Currently Amended)** AThe sensor according to claim 16, wherein the resonant element is metal.
18. **(Currently Amended)** AThe sensor according to claim 17, wherein the resonant element is magnetostrictive.
19. **(Currently Amended)** AThe sensor according to claim 16, wherein the resonant element is piezoelectric.
20. **(Currently Amended)** AThe sensor according to claim 19, wherein the resonant element is a composite of at least two different materials.
21. **(Currently Amended)** AThe sensor according to claim 20, wherein the test sample is in a gaseous phase.
22. **(Currently Amended)** AThe sensor according to claim 21, wherein the resonant element is coated with a polymer layer.
23. **(Currently Amended)** AThe sensor according to claim 22, wherein the test sample is in a liquid phase.
24. **(Currently Amended)** AThe sensor according to claim 23, wherein the electrical coupling means is a multiply resonant transmission line.

25. **(Currently Amended)** AThe sensor according to claim 24,  
wherein the resonant element is coated with a biorecognition layer.
26. **(Currently Amended)** AThe sensor according to claim 25,  
wherein in use, the sensor detects cells.
27. **(Currently Amended)** AThe sensor according to claim 25,  
wherein in use, the sensor detects proteins.
28. **(Currently Amended)** AThe sensor according to claim 25,  
wherein in use, the sensor detects antibodies.
29. **(Currently Amended)** AThe sensor according to claim 25,  
wherein in use, the sensor detects nucleic acids.
30. **(Currently Amended)** A method for use in acoustic sensing, the  
method comprising the steps of:  
  
applying a current to an electrical coupling means;  
transferring current from the electrical coupling means to an  
electromagnetic field source;  
  
driving, with an electromagnetic field produced by the  
electromagnetic field source, at least one resonant element to  
produce acoustic waves directed to a predetermined part of a test  
sample; and  
  
detecting with an electronicelectrical circuit connected to the  
electromagnetic field source together with an electromagnetic  
detector and the electrical coupling means, the acoustic spectrum

produced after the acoustic waves have interacted with the test sample.

31. **(Currently Amended)** AThe method according to claim 30, wherein the at least one resonant element produced acoustic waves by electrostriction.
32. **(Currently Amended)** AThe method according to claim 30, wherein the at least one resonant element produces acoustic waves by magnetostriiction.
33. **(Currently Amended)** AThe method according to claim 32, wherein the acoustic waves are detected by means of an electrical oscillator tuned to the fundamental or harmonic frequency of the resonant element.
34. **(Currently Amended)** AThe method according to claim 32, wherein the acoustic waves are detected by means of a frequency modulated signal generator, an AM diode detector and a lock-in amplifier.